REMARKS

Claims 1-9 and 11-13 are all the claims pending in the application.

Claims 1, 4-9 and 11 are rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections.

Claims 1, 4-6 and 9 are rejected under 35 U.S.C. §102(b) as being anticipated by previously-cited Kafka et al. (US 5,365,366). Claims 1-7, 9, 12 and 13 are rejected under 35 U.S.C. §102(e) as being anticipated by newly-cited Tayebati et al. (US 6,438,149). Claims 8 and 11 are rejected under 35 U.S.C. §103(a) as being unpatentable Tayebati et al.

Also, claim 13 is objected to as being a substantial duplicate of claim 2.

Claim Amendments:

Claims 1, 2 and 3 are amended to clarify that the modulation unit is that which modulates the gain of the active layer in the semiconductor light emitting element. That is, the intensity of the emitted light is modulated by modulating the gain. This amendment emphasizes the fact that the modulation unit of the present invention is not a modulating means for modulating the wavelength.

Claim 6 is amended to clarify that the spatial mode controlling means comprises a first mirror, which is formed to have a limited area.

Claim 7 is amended to clarify the structure of the spatial mode controlling means. That is, the spatial mode controlling means comprises an active layer, which is formed only in a limited area.

Claims 12 and 13 are cancelled.

Regarding the §102 rejection over Kafka:

Kafka discloses a second harmonic generation apparatus. That is, the Kafka apparatus converts a first laser light, emitted from a semiconductor laser, to a second laser light having a wavelength shorter than that of the first laser light. The LBO crystal 20 serves only as a wavelength modulation element for modulating the wavelength of the first laser light.

Applicant submits that Kafka et al. do not teach or suggest the first mirror as recited in claim 1. The Examiner cites the LBO crystal 20 of Kafka et al. as corresponding to the surface emitting semiconductor element. However, the Examiner cites the curved mirror 14 as allegedly corresponding to the first mirror of claim 1. As shown in FIG. 1 of the reference, the curved mirror 14 is an entirely separate element from the LBO crystal 20 of the reference. By contrast, claim 1 recites that the surface emitting semiconductor element comprises a first mirror arranged on one side of the active layer. As clearly shown in figure 1 of the reference, the LBO crystal 20 does not comprise the curved mirror 14. Rather, the curved mirror 14 is an entirely separate element of the apparatus disclosed in the reference. Hence, claim 1 and its dependent claims 4-6 and 9 are not anticipated by Kafka et al.

In addition, Kafka does not teach that the first mirror 14 and the second mirror 16 constitute a resonator.

The Examiner states that in the apparatus disclosed in Kafka, the LBO crystal 20 outputs a second laser light having a longer wavelength than that of a first laser light. However, Kafka neither discloses nor suggests such a structure. As stated previously, Kafka discloses an apparatus that outputs a laser light having a shorter wavelength than that of a first laser, which is emitted from a semiconductor laser. Claim 1 recites an apparatus that generates a second light

having a longer wavelength than that of a first light, which is emitted from an excitation light source.

In addition, the modulation unit of the present invention does not modulate the wavelength of light. Rather the modulation unit modulates the gain of the active layer, to modulate the intensity of the light emitted from the apparatus (the second laser light). This is clearly different from the wavelength modulation, realized by temperature control, disclosed in Kafka.

For at least the above-noted reasons, Applicant submits that claims 1, 4-6 and 9 are not anticipated by Kafka et al.

With regard to the Examiner's rebuttals to items a)-d) as indicated at pages 7-8 of the Detailed Action, Applicant notes the following:

With regard to item a), the Examiner appears to maintain that it is proper to double count the disclosed crystal 20 as both the semiconductor light emitting element and also the source of an excitation light as a result of the light emitting element. There is no inherent reason why the crystal would have both capabilities as the Examiner appears to contend. By contrast, claim 1 includes recitations of two elements. Therefore, the Examiner's rebuttal does not appear to support the rejection.

With regard to item d), the Examiner contends that the temperature controlled devices may modulate an output. However, temperature control relates to a crystal temperature and not the surface emitting element as claimed, due to the defect stated in item a) above. Therefore, Applicant maintains that the arguments of record for the patentability of the claims.

Regarding the §102 and §103 rejections over Tayebati et al.:

Tayebati et al. relates to a manufacturing method for VCSEL. Particularly, Tayebati et al. relates to a manufacturing process for accurately controlling the lateral dimensions of a trampoline structure and an air cavity length, which are important to manufacture devices which are substantially uniform.

The VCSEL disclosed in Tayebati et al. is manufactured as an element which is integrally formed by a first mirror and a second mirror sandwiching an active layer therebetween. This construction differs greatly from the laser apparatus of claim 1 of the present invention, in which the second mirror is provided as an external mirror.

Although Tayebati et al. recites that the VCSL is a semiconductor laser of the excitation light type, the reference does not disclose nor suggest oscillation of light having a longer wavelength than the excitation light. In addition, Tayebati et al. do not disclose nor suggest a modulation unit which modulates the gain of the active layer.

Therefore, Applicant submits that claims 1-7 and 9 are not anticipated by Tayebati et al.

With further regard to claim 9, Applicant submits that Tayebati et al. do not teach or suggest that the first laser light enters the resonator from a first surface of the first mirror which is opposite the active layer to excite the surface-emitting semiconductor element. The Examiner refers to FIG. 2 of the reference as allegedly disclosing this feature of the claims, but Applicant disagrees. FIG. 2 fails to indicate anything about where the first laser light enters the resonator. The only apparent indication of where the light enters the VCSEL of Tayebati et al. is given in FIG. 1, which seems to indicate that light enters the VCSEL through the DBR stack 12, which the Examiner has interpreted as the second mirror. The remainder of the reference appears to be

silent regarding this feature of claim 9. Hence, claim 9 is not anticipated by Tayebati et al. for this additional reason.

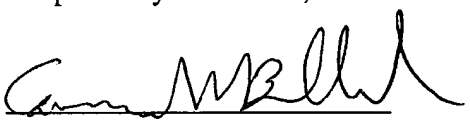
For the rejection of claims 8 and 11 over Tayebati et al., Applicant submits that these claims are allowable over the reference, at least because of their dependence from claim 1.

Also, Applicant submits that Tayebati et al. fail to teach or suggest the limitations of claim 8, and that it would not have been obvious to have modified the teachings of the reference to include the features of claim 8. Recited in claim 8 is a structure for controlling a spatial mode of the second laser light having a size which is 0.1 to 10 times as large as a diameter to which the second laser light spreads at a position of the structure for controlling the spatial mode of the second laser light. The Examiner admits that Tayebati et al. do not disclose this feature of the claim, but asserts that it would have been obvious to have such a feature. However, there is no suggestion or motivation to modify Tayebati et al. to include this specific limitation of claim 8. Tayebati et al. does not recite any values for a structure for controlling a spatial mode of the second laser light. Furthermore, the reference is not concerned with such a structure or its particular size. Rather, Tayebati et al. is directed to a new fabrication process that "provides precise control over the lateral dimensions of the trampoline structure and the air-cavity length, both of which are important for the consistent manufacturing of substantially identical devices." Col. 5, lines 44-48. Therefore, claim 8 is allowable over the prior art.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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